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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/723,181

11/26/2003

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098888-1027

5733

99103

7590

02/14/2011

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EXAMINER

KAU, STEVEN Y

ART UNIT

PAPER NUMBER

2625

MAIL DATE

DELIVERY MODE

02/14/2011

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/723,181	Applicant(s) RODRIGUEZ ET AL.	
	Examiner STEVEN KAU	Art Unit 2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 December 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19,22 and 23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19,22 and 23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/10/10, 10/12/10</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This is in response to Applicant(s) arguments filed on 12/07/2010.

- The following is the current status of claims:

Claims 20 and 21 have been canceled and claims 22 and 23 have been added. Claims 1-19, 22 and 23 are pending for examination, with claims 1, 14, 15, 16, 16, 17 and 19 being independent. Claims 1-19 have been amended.

- IDS Submitted for consideration:

Applicant submitted Information Disclosure Statements on 12/10/2010 and 10/12/2010 is in compliance with the provisions of 37 CFR 1.97.

Accordingly, the information disclosure statement is being considered by the examiner.

- Response to Remarks/Arguments:

(1) Applicant's arguments, section "Claim Objections", page 7, Remarks, 12/07/2010, have been fully considered and are persuasive. In view of claim cancellation, the claim objections under 37 CFR 1.75 is withdrawn from the record.

(2) Applicant's arguments, section "Double Patenting Rejection Based on U.S. Patent Application NO. 10/836,094", page 7, Remarks, 12/07/2010, with respect to claims 17 and 18 have been fully considered. Since claim 31 of U.S. Application NO 10/836,094 has been canceled in the

amendment submitted on 11/16/2010, the double patenting rejections of claims 17 and 18 are withdrawn from the record.

(3) Applicant's arguments, section "Claims Rejections – 35 USC §101", pages 7-9, Remarks, 12/07/2010 have been fully considered. The 101 rejections of claims 14, 16 and 19 are overcome in view of the recitation "A non-transitory computer-readable medium" for excluding those transitory embodiments.

(4) Applicant's arguments, section "Claim Rejections – 35 USC §103", pages 10-15 have been fully considered but are moot in view of the new ground(s) of rejection due to the amendments.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1, 2, 14-17, 19 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Natarajan (US 6,611,599) in view of Sugano et al (US 5,481,378).

Regarding claim 1.

Natarajan discloses a method for analyzing an image of a printed object to determine whether the printed object is a copy or an original, the method comprising: determining, using a computing device (**i.e. applicable digital electronics including microprocessors and computers**), whether a machine-readable auxiliary signal (**watermark**) is embedded in the image (**referring to Figs 5-11, an example of detecting the presence of watermark, which is a machine readable signal, col 9, line 64 to col 10, line 50**); and evaluating the machine-readable auxiliary signal, using the computing device, to determine whether the printed object is a copy or an original (**referring to Fig. 4, a suspect object is evaluated to determine whether it is derived from a watermarked object, col 8, line 47 to col 9, line 30**).

Natarajan does not explicitly teach that wherein the machine-readable auxiliary signal is embedded at embedding locations using a set of two or more print structures; wherein the print structures change in response to a copy operation; and wherein the change causes a divergence or convergence of a characteristic of the print structures such that the machine-readable auxiliary signal becomes more or less detectable.

In the same field of endeavor, Sugano teaches that wherein the machine-readable auxiliary signal (**specific mark**) is embedded at embedding locations (**i.e. a special mark is attached to the original document as illustrated in Figs. 17A-B, is used to distinguish a non-reproducible document, col 10, lines 62 to col 11, line 3**) using a set of two or more print structures (**i.e. print structures such as color and dot type, col 32, lines 20-41 and col 38, lines 57-67**); wherein the print structures change in response to a copy operation (**color and dot type are changed, col 32, lines 20-41 and col 38, lines 57-67**); and wherein the change causes a divergence or convergence of a characteristic of the print structures such that the machine-readable auxiliary signal becomes more or less detectable (**the copy of the original is discriminated, col 32, lines 20-41 and col 38, lines 57-67**).

Prior art Natarajan discloses a method and electronic digital devices, i.e. microprocessors and computers to evaluate the presences of watermarks and to determine whether a suspect object is derived from a watermarked object, i.e. an watermarked image of Fig. 6. Prior art Sugano discloses an image forming apparatus (e.g. Figs. 11 and 15) and a method for discriminating whether or not a document is a copy of an original. A specific mark (e.g. Figs. 17A and 17B) is attached to the document. The color and dot type of the specific mark is changed in response to the reprint operation and therefore, the copy of the original document is discriminated. Therefore, prior arts Natarajan and Sugano are the same filed of endeavors and the teaching of Sugano is combinable to Natarajan.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Natarajan reference to include teaching of "the machine-readable auxiliary signal is embedded at embedding locations using a set of two or more print structures; wherein the print structures change in response to a copy operation; and wherein the change causes a divergence or convergence of a characteristic of the print structures such that the machine-readable auxiliary signal becomes more or less detectable" taught by Sugano reference to further enhance the technique of determining whether a suspect object is an original object, in order to prevent fraudulent attempts.

The suggestion/motivation for doing so would have been to enhance the method of Natarajan more efficiently and accurately in determining whether a suspect object is an original (col 32, lines 30-32, Sugano).

Therefore, it would have been obvious to one of ordinary skill in the art to combine the Natarajan and the Sugano references in order to obtain the invention as specified in claim 1.

Regarding claim 2, of claim 1.

Natarajan does not explicitly disclose wherein the set of two or more print structures include a first color and a second color that change differently in response to a copy operation.

Sugano discloses wherein the set of two or more print structures include a first color (**color components of RGB**) and a second color (**color components of RGB**) that change differently in response to a copy operation (**col 32, lines 30-41**).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Natarajan reference to include teaching of "the set of tow or more print structures include a first color and a second color that change differently in response to a copy operation" taught by Sugano reference to further enhance the technique of determining whether a suspect object is an original object, in order to prevent counterfeit attempts.

The suggestion/motivation for doing so would have been to enhance the method of Natarajan more efficiently and accurately in determining whether a suspect object is an original (col 32, lines 30-32, Sugano).

Therefore, it would have been obvious to one of ordinary skill in the art to combine the Natarajan and the Sugano references in order to obtain the invention as specified in claim 2.

Regarding claim 14.

Claim 14 is directed to a non-transitory computer-readable medium claim which substantially corresponds to operation of the steps in claim 1, with processing steps directly corresponding to the step functions in claim 1. Thus, claim 14 is rejected as set forth above for claim 1.

Regarding claim 15.

Natarajan discloses a method for creating an image to be printed on a printed object (**referring to Fig. 6, a watermarked image, col 9, line 67 to col 10, line 1**), the

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image being used to determine whether a printed image is a copy or an original (**a suspect object is evaluated to determine whether it is derived from a watermarked object, col 8, line 47 to col 9, line 30**), the method comprising: using a computing device (**i.e. applicable digital electronics including microprocessors and computers**) a machine readable auxiliary signal (**i.e. a watermark**) in the image (**a watermark is incorporated into a digital object, or an image, col 3, lines 55-63**); and creating a metric based in part on the machine-readable auxiliary signal embedded in the image (**i.e. steps of the method of Fig. 4, col 8, lines 47-67**), using a computing device to detect the convergence or divergence from an image scanned of a suspect printed object to determine whether the suspect printed object is a copy or an original (**a suspect object is evaluated to determine whether it is derived from a watermarked object, col 8, line 47 to col 9, line 30**).

Natarajan does not explicitly disclose wherein the auxiliary signal is embedded at embedding locations one or more print structures that change in response to a copy operation, and wherein the change causes a divergence or convergence of a characteristic of the print structures such that the machine readable signal becomes more or less detectable.

In the same field of endeavor, Sugano teaches wherein the auxiliary signal (**specific mark**) is embedded at embedding locations (**i.e. a special mark is attached to the original document as illustrated in Figs. 17A-B, is used to distinguish a non-reproducible document, col 10, lines 62 to col 11, line 3**) using one or more print structures (**i.e. print structures such as color and dot type, col 32, lines 20-41**

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and col 38, lines 57-67) that change in response to a copy operation (**color and dot type are changed, col 32, lines 20-41 and col 38, lines 57-67**), and wherein the change causing a divergence or convergence of a characteristic of the print structures such that the machine readable signal becomes more or less detectable (**the copy of the original is discriminated, col 32, lines 20-41 and col 38, lines 57-67**).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Natarajan reference to include teaching of "the auxiliary signal is embedded at embedding locations one or more print structures that change in response to a copy operation, and wherein the change causes a divergence or convergence of a characteristic of the print structures such that the machine readable signal becomes more or less detectable" taught by Sugano reference to further enhance the technique of determining whether a suspect object is an original object, in order to prevent any fraudulent attempt.

The suggestion/motivation for doing so would have been to enhance the method of Natarajan more efficiently and accurately in determining whether a suspect object is an original (col 32, lines 30-32, Sugano).

Therefore, it would have been obvious to one of ordinary skill in the art to combine the Natarajan and the Sugano references in order to obtain the invention as specified in claim 15.

Regarding claim 16.

Claim 16 is directed to a non-transitory computer-readable medium claim which substantially corresponds to operation of the steps in claim 15, with processing steps

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directly corresponding to the step functions in claim 15. Thus, claim 16 is rejected as set forth above for claim 15.

Regarding claim 17.

Natarajan discloses a method for analyzing an image of a printed object to determine whether the printed object is a copy or an original, the method comprising: determining, using a computing device (**i.e. applicable digital electronics including microprocessors and computers**) whether a machine-readable auxiliary signal (**i.e. watermark is inserted into a digital image, col 3, lines 53-63**) is embedded in the image (**referring to Figs 5-11, an example of detecting the presence of watermark, which is a machine readable signal, col 9, line 64 to col 10, line 42**), and determining, based on evaluating the machine-readable auxiliary signal, using a computing device, whether the printed object is a copy or an original (**referring to Fig. 4, a suspect object is evaluated to determine whether it is derived from a watermarked object, col 8, line 47 to col 9, line 30**).

Natarajan does not explicitly disclose wherein the auxiliary signal is embedded at embedding locations using a print structure that changes in response to a copy operation, the change causing a divergence or convergence of a characteristic of the print structures such that the machine readable signal becomes more or less detectable, and wherein the print structure comprises a color that changes in response to a copy operation.

In the same field of endeavor, Sugano teaches wherein the auxiliary signal (**specific mark**) is embedded at embedding locations (**i.e. a special mark is attached**

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to the original document as illustrated in Figs. 17A-B, is used to distinguish a non-reproducible document, col 10, lines 62 to col 11, line 3) using a print structure that change in response to a copy operation (i.e. print structures such as color and dot type, and both color and dot type are changed in response to reprint operation, col 32, lines 20-41 and col 38, lines 57-67), the change causing a divergence or convergence of a characteristic of the print structures such that the machine readable signal becomes more or less detectable (the copy of the original is discriminated, col 32, lines 20-41 and col 38, lines 57-67), and wherein the print structure comprises a color that changes in response to a copy operation (col 32, lines 20-41).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Natarajan reference to include teaching of "the auxiliary signal is embedded at embedding locations using a set of two or more print structures that change in response to a copy operation, the change causing a divergence or convergence of a characteristic of the print structures such that the machine readable signal becomes more or less detectable and wherein the print structure comprises a color that changes in response to a copy operation" taught by Sugano reference to further enhance the technique of determining whether a suspect object is an original object, in order to prevent any fraudulent attempt.

The suggestion/motivation for doing so would have been to enhance the method of Natarajan more efficiently and accurately in determining whether a suspect object is an original (col 32, lines 30-32, Sugano).

Therefore, it would have been obvious to one of ordinary skill in the art to combine the Natarajan and the Sugano references in order to obtain the invention as specified in claim 17.

Regarding claim 19.

Claim 19 is directed to a non-transitory computer-readable medium claim which substantially corresponds to operation of the steps in claim 17, with processing steps directly corresponding to the step functions in claim 17. Thus, claim 19 is rejected as set forth above for claim 17.

Regarding claim 23, of claim 14.

Claim 23 recites identical features as claim 2. Thus, arguments similar to that presented above for claim 2 are also equally applicable to claim 23.

4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Natarajan (US 6,611,599) in view of Sugano et al (US 5,481,378) as applied to claim 2 above, and in view of Tavernier et al (US 5,824,447).

Regarding claim 3, in accordance with claim 2.

Natarajan in view of Sugano does not disclose wherein at least one of the colors corresponds to an ink color that is out of gamut of a printer or scanner.

In the same field of endeavor, Tavernier teaches wherein at least one of the colors corresponds to an ink color that is out of gamut of a printer or scanner (i.e. **"It is possible to introduce pigments having a color laying outside of the color gamut**

printable by normal photocopiers in such a way that photocopying of the document is impossible", col 8, lines 16-19).

Prior art Tavernier discloses a method and apparatus for security printing to prevent fraudulent use of the original documents such bank cards, driver license, etc. Therefore, prior art Tavernier, Natarajan and Sugano are the same field of endeavor. The teaching of Tavernier reference is combinable to Natarajan and Sugano references.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the combination of Natarajan in view of Sugano to include wherein at least one of the colors corresponds to an ink color that is out of gamut of a printer or scanner as taught by Tavernier. The motivation for doing so would have been to enhance document security protection and to more effectively identify whether or not a printed copy is an original; and further it is easily implemented by one or other in the art with a predictable result.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Natarajan (US 6,611,599) in view of Sugano et al (US 5,481,378) as applied to claim 2 above, and in view of Kimura et al (US 6,434,322).

Regarding claim 4, in accordance with claim 2.

Natarajan in view of Sugano does not disclose wherein a difference in luminance of the two colors changes in response to a copy operation.

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Kimura teaches wherein a difference in luminance of the two colors changes in response to a copy operation (**i.e. luminance value is changed in the reproduction method, col 2, lines 51-67 and col 7, lines 14-21**).

Prior art Kimura discloses a method and apparatus for copy control with watermark detection, and change of watermark luminance when it is copied. Therefore, prior art Kimura, Natarajan and Sugano are the same field of endeavor, and the teaching of Kimura is combinable to Natarajan and Sugano.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the combination of Natarajan in view of Sugano to include wherein a difference in luminance of the two colors changes in response to a copy operation as taught by Kimura. The motivation for doing so would have been to enhance document security protection and to prevent fraudulent attempts; and further it is easily implemented by one or other in the art with a predictable result.

6. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Natarajan (US 6,611,599) in view of Sugano et al (US 5,481,378) as applied to claim 1 above, and in view of Ostromoukhov et al (US 6,198,545).

Regarding claim 5, in accordance with claim 1.

Natarajan in view of Sugano does not disclose wherein the set of two or more print structures include a first print structure having a first dot gain property and a second print structure having a second dot gain property; wherein the first print structure

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is more susceptible to dot gain than the second print structure in response to a copy operation.

Ostromoukhov teaches wherein the set of two or more print structures include a first print structure having a first dot gain property and a second print structure having a second dot gain property (**i.e. variations of the halftoning period are useful to prevent non authorized copies of images produced in this manner; this is due to the fact that small screen dots and large screen dots are subjected to a different dot gain during reproduction, col 9, lines 5-26**); wherein the first print structure is more susceptible to dot gain than the second print structure in response to a copy operation (**i.e. referring Figs. 20 & 21, two different print structure gives different result and one is more susceptible than the other; col 9, lines 5-26**).

Prior art Ostromoukhov discloses a method and apparatus for synthesizing, displaying and printing color or black/white halftone image with subscreen dot shape variations to avoid counterfeiting. Thus prior art Ostromoukhov and Natarajan and Sugano are the same field of endeavor.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the combination of Natarajan in view of Sugano to include the set of two or more print structures include a first print structure having a first dot gain property and a second print structure having a second dot gain property; wherein the first print structure is more susceptible to dot gain than the second print structure in response to a copy operation as taught by Ostromoukhov. The motivation for doing so would have been to enhance document security protection and to prevent

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counterfeiting; and further it is easily implemented by one or other in the art with a predictable result.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Natarajan (US 6,611,599) in view of Sugano et al (US 5,481,378) as applied to claim 1 above, and in view of Coonan et al (US 5,687,297).

Regarding claim 6, in accordance with claim 1.

Natarajan in view of Sugano does not disclose wherein a difference in luminance of the set of two or more print structures changes in response to a copy operation due to a difference in susceptibility to dot gain of the set of two or more print structures.

Coonan teaches wherein a difference in luminance of the print structures changes in response to a copy operation due to a difference in susceptibility to dot gain of the set of two or more print structures (**i.e. applying augment compact dot grow mode to detect an edge or brightness transition between a target and any of its adjacent relative of the neighboring pixels; that is, a difference in luminance of the print structures changes in response to a copy operation due to a difference in susceptibility to dot gain of the print structures; col 10, lines 28-56**).

Prior art Coonan discloses a method and apparatus for dot growth control and bit-map tuning for image reproduction. However, as discussed above, the technique of dot growth control can be used to prevent non-authorized copies of images being produced (see Ostromoukhov et al, US 6,198,545). Thus, the teaching of Coonan reference is combinable to prior art Natarajan in view of Sugano.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the combination of Natarajan in view of Sugano to include wherein a difference in luminance of the set of two or more print structures changes in response to a copy operation due to a difference in susceptibility to dot gain of the set of two or more print structures as taught by Coonan. The motivation for doing so would have been to enhance document security protection and to prevent counterfeiting in image reproduction; and further it is easily implemented by one or other in the art with a predictable result.

8. Claims 7, 8, 18 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Natarajan (US 6,611,599) in view of Sugano et al (US 5,481,378) as applied to claims 1, 17 and 19, and further in view of Sonoda et al (US 6,014,453).

Regarding claim 7, in accordance with claim 1.

Natarajan does not disclose wherein the set of two or more print structures include a first print structure having a first aliasing property and a second print structure having a second aliasing property; wherein the first print structure aliases differently than the second print structure.

In the same field of endeavor, Sonoda teaches wherein the set of two or more print structures include a first print structure having a first aliasing property (**referring to Fig. 13A, the change of print structure, i.e. shifted position, col 15, lines 27-42**) and a second print structure having a second aliasing property (**i.e. change in color and density, col 22, lines 53-58**); wherein the first print structure aliases differently

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than the second print structure (**position shift of the pattern or mark of Fig. 13A and changing color and density of a print structure are two different aliasing properties**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Natarajan to include wherein the set of print structures include a first print structure having a first aliasing property and a second print structure having a second aliasing property; wherein the first print structure aliases differently than the second print structure as taught by Sonoda. The motivation for doing so would have been to improve the effectiveness in detecting whether or not an image is an original image; and further it is easily implemented by one or other in the art with a predictable result.

Regarding claim 8, in accordance with claim 1.

Natarajan discloses wherein the machine-readable auxiliary signal (**i.e. watermark**) is embedded (**i.e. watermark is inserted into a digital object, i.e. an image of Fig. 6, col 3, lines 53-55, and col 9, line 67 to col 10, line 1**).

Natarajan does not explicitly disclose wherein the machine readable auxiliary signal is embedded by varying continuity of line structures.

Sonoda discloses wherein the machine-readable auxiliary signal (**i.e. patterns added to an image discussed above**) is embedded by varying continuity of line structures (**referring to Figs. 8, 11 and 13, etc., the auxiliary signal, or pattern can**

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be different shapes, i.e. angular or circular, or characters, col 14, lines 28-45 and col 15, lines 27-43).

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Natarajan reference to include teaching of "the auxiliary signal is embedded by varying continuity of line structures" taught by Sonoda reference to further improve the watermark structure to be more complex to prevent any fraudulent attempt.

The suggestion/motivation for doing so would have been to enhance the method of Natarajan to improve the watermark structure to be more complex to further prevent any fraudulent attempt.

Therefore, it would have been obvious to one of ordinary skill in the art to combine the Natarajan and the Sonoda references in order to obtain the invention as specified in claim 8.

Regarding claim 18, of claim 17.

Claim 18 recites identical features as claim 8. Thus, arguments similar to that presented above for claim 8 are also equally applicable to claim 18.

Regarding claim 22, of claim 19.

Claim 22 recites identical features as claim 8. Thus, arguments similar to that presented above for claim 8 are also equally applicable to claim 22.

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9. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Natarajan (US 6,611,599) in view of Sugano et al (US 5,481,378) as applied to claim 1 above, and further in view of Castagnoli (US 5,074,596).

Regarding claim 9, in accordance with claim 1.

Natarajan in view of Sugano does not disclose wherein one print structure comprises a line segment in a first color, and another print structure comprises a line segment in a second color, wherein the first color is different than the second color.

Castagnoli teaches wherein one print structure comprises a line segment in a first color, and another print structure comprises a line segment in second color, wherein the first color is different than the second color (**i.e. referring to Figs. 1-9, line segments with different color designs; col 3, lines 12-18 and col 4, lines 18-61**).

Prior art Castagnoli discloses method in designing a safety document for anti-counterfeit with different color in different line segments. Therefore, prior art Castagnoli, Natarajan and Sugano are the same field of endeavor. The teaching of Castagnoli is combinable with Natarajan and Sugano.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the combination of Natarajan in view of Sugano to include wherein one print structure comprises a line segment in a first color, and another print structure comprises a line segment in second color, wherein the first color is different than the second color as taught by Castagnoli. The motivation for doing so would have been to enhance document security protection to anti-counterfeiting; and further it is easily implemented by one or other in the art with a predictable result.

Regarding claim 10, in accordance with claim 9.

Natarajan in view of Sugano does not disclose wherein the line segments of the different colors are arranged by varying between the first and second colors along a printed line.

Castagnoli teaches wherein the line segments of the different colors are arranged by varying between the first and second colors along a printed line (i.e. **referring to Figs. 5 and 5a, line segments have alternately different colors, Abstract, and col 4, lines 40-61**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the combination of Natarajan in view of Sugano to include wherein the line segments of the different colors are arranged by varying between the first and second colors along a printed line as taught by Castagnoli. The motivation for doing so would have been to improve document security protection and to enhancing the method of Natarajan to avoid fraudulence and counterfeit; and further it is easily implemented by one or other in the art with a predictable result.

10. Claims 11, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Natarajan (US 6,611,599) in view of Sugano et al (US 5,481,378) as applied to claim 1 above, and in view of Umeda (US 7,027,189).

Regarding claim 11, in accordance with claim 1.

Natarajan in view of Sugano does not disclose wherein the evaluating includes evaluating a frequency domain metric to detect changes in the print structures.

Umeda teaches wherein the evaluating includes evaluating a frequency domain metric to detect changes in the print structures (**i.e. increase of power in low-frequency domain degrades the image quality and therefore a counterfeit is detected, col 4, line 28 to col 5, line 41 and Fig. 10**).

Prior art Umeda discloses a method and apparatus for image processing of embedding a different kind of information in an image for anti-counterfeiting. Prior art Umeda, Natarajan and Sugano are the same field of endeavor and therefore, the teaching of Umeda is combinable to Natarajan in view of Sugano.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the combination of Natarajan in view of Sugano to include wherein the evaluating includes evaluating a frequency domain metric to detect changes in the print structures as taught by Umeda. The motivation for doing so would have been to enhance document security protection and to prevent forgery; and further it is easily implemented by one or other in the art with a predictable result.

Regarding claim 12, in accordance with claim 11.

Natarajan in view of Sugano does not disclose wherein the frequency domain metric is a radial frequency domain metric.

In the same field of endeavor, Umeda teaches wherein the frequency domain metric is a radial frequency domain metric (**referring to Figs. 8A-C, and 9A-C, which disclose radial frequency domain, col 4, lines 39-64**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the combination of Natarajan in view of Sugano to include wherein the frequency domain metric is a radial frequency domain metric as taught by Umeda. The motivation for doing so would have been to enhance frequency domain detection by evaluating the power distribution and to detect whether a printed copy is a copy or an original; and further it is easily implemented by one or other in the art with a predictable result.

Regarding claim 13, in accordance with claim 11.

Natarajan in view of Sugano does not disclose wherein the frequency domain metric is used to evaluate changes in color of a print structure.

Umeda teaches wherein the frequency domain metric is used to evaluate changes in color of a print structure (**i.e. referring to Fig. 10, evaluating power spectrum of color component for dot-pattern, col 5, lines 13-41**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the combination of Natarajan in view of Sugano to include wherein the frequency domain metric is used to evaluate changes in color of a print structure as taught by Umeda. The motivation for doing so would have been to enhance frequency domain detection by evaluating the power spectrum of a color component and to detect whether a printed copy is a copy or an original; and further it is easily implemented by one or other in the art with a predictable result.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Kau whose telephone number is 571-270-1120 and fax number is 571-270-2120. The examiner can normally be reached on Monday to Friday, from 8:30 am -5:30 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Steven Kau/
Examiner, Art Unit 2625
February 10, 2011

/David K Moore/
Supervisory Patent Examiner, Art Unit 2625